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SCIENCE TRENDS

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Project Wagnight

Admiral Arleigh Burke, Chief of Naval Operations, has advised Congress that the Navy has a "great interest" in Project Wagnight, an inflatable long-range missile-aircraft first disclosed in Washington SCIENCE TRENDS Dec. 14, 1959.

Vice Adm. John T. Hayward and an aide, meanwhile, told the House Committee on Science and Astronautics that the project is considered technically feasible but that more work must be done on the materials involved. He also declared that there were projects of greater urgency which have been held up because of budgetary restrictions.

Capt. Cooper Bright told the Committee he directed a study of Project Wagnight for the Chief of Naval Operations which demonstrated conclusively that the Wagnight system is technically feasible, operationally desirable and capable of providing an important addition to the Nation's strategic deterrent and limited war forces at low cost and in rapid time.

The Committee's investigation is one of several expected before Congress adjourns in June or July.

Project Yo-Yo is the Navy's code name for a single-pass photographic reconnaissance satelloid now being studied. The Navy advised Congress this week that a Yo-Yo "can be programmed to pass over any pre-selected point on earth on its first pass, and subsequently be recovered at sea upon completion of a single orbit."

The Navy also advised that "the air launch of small and nominal size satellites has many advantages since a high-speed aircraft is substituted for the expensive first stage booster. The use of carrier-based aircraft for this purpose makes a tremendous area of the earth's surface available for use as launch points, with a free choice of launching directions well clear of populated areas." (For details of Navy plans for air-launched satellites and satelloids see Washington SCIENCE TRENDS Nov. 2, 1959 -- an exclusive report which was promptly and officially denied at the time.)

Polaris is described by the Navy as "a logical candidate for partial modification as a satellite launching vehicle" because of its "unique success, simplicity and relatively low cost."

Trends In The Making

- * Defense Communications may be on a department-wide basis under a new order from Secretary Thomas Gates. Over vigorous objections of the services he has ordered a plan drawn up providing a system for all point-to-point requirements of the Joint Chiefs, the Unified and Specified military commands, and the services. Facilities include command and control functions, intelligence, weather, logistics and administration as well as ship-to-shore, ground-air-ground and certain weapons system requirements. System would be managed and operated by a single agency within the Department. Operations would begin on a phased basis so as not to disrupt essential communications during transition.
- * Weather Bureau shakeup may be in the making. Congressional critics are urging the Bureau to break away from alleged "one-man rule." More coordination between various weather agencies is also urged. Government is spending \$190.5 million on weather programs this year -- with the Bureau accounting for \$60.4 million. Of meteorological research funds -- almost \$50 million -- the Bureau is spending only \$8.3 million.
- * New Grant Policy proposed by the Department of Health, Education and Welfare may point the way for other Government agencies sponsoring research. It is suggested that grants be permitted for the general support of research programs of institutions, as well as grants now authorized to support specific projects. The Department reasons that the new policy, if approved, would give institutions a larger measure of freedom and autonomy in determining the character and direction of their research activities.
- * Decca Navigation System report, heavily critical of this British equipment, is now available. Subscribers desiring a free copy should write to Federal Aviation Agency, Bureau of Research and Development. Library, Washington 25, D.C. Ask for "Helicopter Operations Program, Phase I."
- * Computer Policy of the Census Bureau is being critized by Congressional sources. They question advance rental payments of \$700,000 each to the University of North Carolina and Armour Research Foundation. It is alleged that this money, coupled with \$500,000 donated to North Carolina by the National Science Foundation, would have been more than enough to purchase a model 1105 Univac outright. Census Bureau replies that this arrangement actually saved the Government money and will provide a peak capacity to meet Census needs.
- * Speed Mail is the new Post Office Department name for the facsimile service to be developed under a \$3.3 million R&D contract with International Telephone and Telegraph. Officials said scanning speeds of three message pages per second are attainable, with the only limitation on ultimate speed being the physical movement of the paper at the receiving end. Transmission is by coaxial cables or microwaves. It is contemplated that a machine will either "read" such mail through an envelope, or open the envelope, take out and "read" the letter; send it out according to coded directions to an unscrambling and printing machine. Normal mail delivery would follow. Computer-type storage techniques would permit high volume transmission during slack cable or microwave periods.

Metal Adhesives for Space Applications

National Bureau of Standards has been investigating the low-temperature strengths of metal adhesives which are expected to play an important role in the assembly of metal components in missiles and spacecraft.

The adhesives are said to have the advantages of resilience, resistance to galvanic corrosion and high strength-to-weight ratios.

Adhesives tested included a filled epoxide, two epoxy-phenolic, three rubber-phenolic and four vinyl-phenolic compounds. Failures were classified respectively as adhesive or cohesive in tests at temperatures ranging down to minus 425 degrees fahrenheit.

Researchers concluded that the epoxy-phenolics, both having a fiberglass supporting film, gave the best performance. The epoxide exhibited slightly less low-temperature stress, although this might have been due to faulty bonding. NBS points out that results obtained in their tests do not necessarily indicate the utility of the various types of adhesives for applications under normal environmental conditions since none were formulated to withstand the particular test conditions.

Radiation Effects on Coal

Government studies indicate that irradiation changes the physical and chemical characteristics of certain coals but leaves most varieties "substantially unchanged."

Studies by the Bureau of Mines and the U.S. Geological Survey have demonstrated that coal is remarkably resistant to neutron and gamma-ray bombardment. However, it is believed that irradiation does make coal "harder" -- an effect which might ultimately make possible the manufacture of stronger coke.

Improvements in processes for converting coal to liquid fuels and chemicals are a long-range goal of the studies. In certain ranks of bituminous coal, irradiation disturbs the electrical balance within the coal molecule which may some day lead to means to make coal react more readily with other materials.

Future studies will concentrate on coal which has been mixed with other substances, or which has been irradiated during processing. The possibility of using other forms of radiant energy, such as that created electrostatically, by X-rays or high-intensity light sources will be evaluated. The Bureau has proposed several coal research projects aimed specifically at developing uses for gamma radiation, which would be available at relatively low-cost from spent atomic fuel elements.

Blending Explosive Mixtures

Golf balls are being used by the Navy to break up "lumpy" explosive mixtures in laboratory work. A half-dozen golf-balls are placed in the chamber of a blender with the mixture. This replaces sifting through a fine screen -- a method said to be slower and somewhat hazardous. Results with the new technique are said to be up to par.

(Devised by W. Johnson, Chemical Engineering Division. Chemistry Research Department, U.S. Naval Ordnance Laboratory, White Oak, Md.)

Royalty-Free Patent Checklist

Here is a new listing of Government-owned patents now available for use by industry on a royalty-free basis. Subscribers desiring further information may write Service Department, Washington SCIENCE TRENDS, 1120 National Press Bldg., Washington 4, D.C. You will be furnished with the patent number and classification, and information on where and how to apply for licensing.

- () Digital Convertor: In this patent the convertor reads perforated tape and translates the numerical information in the coded perforations into analogous voltages. The device includes a storage condensor and a number of incremental condensers of different capacities.
- () Aircraft Fuel Cell: No bonding is said to be required in this aircraft fuel cell which has its bladder made integral with the self-sealing portion. The cell is said to be lighter in weight because of the use of single unit construction.
- () Tube Boot: Better cushioning for electron tubes is said to be made possible with this device, which employs vertical or circumferential ribs in a rubber body.
- () Metal Spinning Machine: This automatic device is for spinning metal blanks into hollow objects of any desired configuration or any desired wall taper or lack of taper.
- () Magnetic Armature Transducer: This is a ribbon-type magnetic armature transducer which is said to have less moving mass than earlier types and a better impedance match with the air.
- () High-Speed Computer Printer: This printer mechanism is said to provide an accurately aligned printed record of rapidly flowing data from a high-speed computer.
- () Liquid Level Indicator: This unit is designed to facilitate rapid inventory in supply stocks held in gas and water tanks. The ohm/inch of liquid ratio varies according to tank depth.
- () Resin Stabilizer: This patent is said to cover plasticizer stabilizers for synthetic resins having high compatability, and efficiency with a wide range of resins.
- () Piezoelectric Sandwich Transducer: Mass-produced units of this type are said to have smaller dimensions and mass than magnetostrictive transducers operating at the same frequency.
- () Lens Iris Adjustment: This patent covers a novel remote control unit for adjustment of a lens iris for television and other photographic cameras.
- () Microswitch: This switch uses a snap action switch leaf having one end fixed to a terminal and the other end free to move between a pair of contacts so that it is responsive to acceleration.

Research Checklist

- () Brushless Generator: Navy researchers have developed a brushless, regulated ac generator which is said to eliminate radio interference resulting from brushes, slip rings and commutators in similar devices of conventional design. It was concluded from prototype tests that brushless generators with standard performance characteristics can be built with all sliding, current-carrying surfaces eliminated. Such machines are said to have inherent in their design prospects of highly reliable operation.

(R&D by U.S. Naval Civil Engineering Laboratory, Port Hueneme, Calif. Technical Report of Sept., 1959 now available. Write OTS, U.S. Department of Commerce, Washington 25, D.C., for PB 161 104. 40 pages. \$1.50)

- () Hot Gas Control System: Air Force has contracted with Bendix Aviation Corp. to develop, build and test a so-called "hot gas" flight stabilization and control system for semi-orbital vehicles and missiles. The exploratory work is designed to determine whether such a system, operating on mechanical principles, is feasible, or superior to other devices. No electronic components would be required, and the system would be unaffected by radiation or high temperature, it was reported.

(R&D by Eclipse Pioneer and Bendix Research Laboratories Divisions for Flight Control Laboratory, Wright Air Development Division, U.S. Air Force, Dayton, Ohio)

- () Water Distillation Unit: Aluminum may replace cupro-nickel in sea water distillation units being developed by the U.S. Army. The new equipment is expected to be lighter, have greater capacity, better fuel economy and is expected to eliminate the requirement for large amounts of nickel which may not be available in the event of mobilization. Re-design of conventional distillation units was required, including the elimination of copper components. It was determined that even trace amounts of copper in sea water promotes galvanic corrosion of the aluminum.

(R&D by U.S. Army, Engineer Research and Development Laboratories, Ft. Belvoir, Va.)

- () Ice Detection System: Studies by the Armour Research Foundation have led to development of a device, said to be simple and inexpensive, which utilizes the principle of light refraction to alert pilots to aircraft icing. The unit includes two translucent plastic rods placed parallel and a fraction of an inch apart on the plane's wing. A light is beamed into one rod, while an electric eye monitors the other. When ice forms the light refracts through the ice and into the second rod, to activate the electric eye.

(R&D by Armour Research Foundation, Illinois Institute of Technology, Chicago 16, Ill. for Chicago Aerial Industries, Inc.)

Publication Checklist

- () Project Mercury, the most complete report printed to date on the background, systems, research and development program, tracking and communication network and operational concept of Project Mercury, the program to develop and launch a manned orbital capsule. 78 pages. Single copies free. (Write Committee on Science and Astronautics, U.S. House of Representatives, George Washington Inn, Washington 25, D.C., for Project Mercury - House Report No. 1228)
- () Government Assistance to Invention and Research, a legislative history prepared by the Library of Congress on the statutory background of a number of present and proposed agencies in the research and development field. 199 pages. Single copies free. (Write Patents Subcommittee, Committee on the Judiciary, U.S. Senate, Washington 25, D.C., for Study No. 22)
- () Commerce Department Appropriations, a transcript of closed-door hearings on funds for the National Bureau of Standards, U.S. Weather Bureau, Bureau of the Census, Coast and Geodetic Survey and other technical agencies of the Commerce Department. 826 pages. Single copies free. (Write Committee on Appropriations, U.S. House of Representatives, The Capitol, Washington 25, D.C., for Hearings - Department of Commerce, Fiscal 1961)
- () Medical School Research Funds, a report by the National Science Foundation on where the money comes from for research at medical schools. 5 pages. Single copies free. (Write Information Office, National Science Foundation, Washington 25, D.C., for Publication NSF-60-10)
- () Mercury, a materials survey discussing the history, resources, properties, uses and substitutes, technology, and supply and distribution of mercury. 92 pages. \$1. (Write Superintendent of Documents, Government Printing Office, Washington 25, D.C., for Publication I 28.27:7941)
- () Catalysts, a Government study comparing results obtained with 17 different catalysts in hydrogenating crude shale oil to gasoline in single-pass operation. 29 pages. Single copies free. (Write Publications-Distributions Office, U.S. Bureau of Mines, 4800 Forbes Avenue, Pittsburgh 13, Pa., for Report of Investigation No. 5533)
- () Dosimetry, a new study by the National Bureau of Standards discussing efforts to cover the range below 20 mr with film-scintillator combinations and with photographic dosimeters. 26 pages. 50 cents. (Write OTS, U.S. Department of Commerce, Washington 25, D.C. for NBS Technical Note No. 29)
- () Project Argus, a symposium on scientific effects of artificially introduced radiation at high altitudes. Reprinted from Proceedings of the National Academy of Sciences. 88 pages. \$1. (Write Publication Office, NAS, 2101 Constitution Avenue, N.W., Washington 25, D.C., for Symposium on Scientific Effects of Radiations)

Navy - Bureau of Aeronautics^{1/}

Subject	Contact
	Telephone: Washington, D.C. OXford (plus extension)
Automotive vehicles, special types, including bomb service trucks, bomb cargo trucks, ordnance utility pickup trucks and fork lifts (Code SE-73)	Mr. E. L. Doyle Extension 67272
Design of devices to rearm naval air- craft aboard ships (Code AV-2124)	Mr. L. X. Abernathy Extension 62203 or 66087
Handling equipment, material, methods and techniques, including aircraft rearming (Code SI-7)	Mr. R. J. Murphy Extension 62638 or 67602

Bureau of Ordnance^{1/}

	Telephone: Washington, D.C. OXford (plus extension)
Automotive vehicles, special types, including boom trucks, fork-lift trucks, side-loaders, launcher loaders, aircraft loaders, cranes, missile-handling, dockside, dollies, transfer shipboard (Code RED-3)	Mr. G. J. Geyer Extension 67007

Bureau of Ships

	Telephone: Washington, D.C. OXford (plus extension)
Amphibious vehicles (Code 527)	Mr. R. M. Alexander, Extension 63415
Automotive vehicles, general types (Code 632)	Mr. V. M. Remigailo Extension 65474
Bearings, all types	Engineering Experiment Station Annapolis, Maryland Telephone: COLonial 3-2611 Mr. Watt Smith, Extension 1437

Bureau of Yards and Docks

	Telephone: Washington, D.C. OXford (plus extension)
Automotive vehicles, general types (Code D-230)	Mr. R. H. Welles Extension 77334
Ship Missile Program Division	Naval Air Engineering Facility (S1) Philadelphia, Pennsylvania Telephone: HOward 5-1000 Mr. A. Kowalezyk, Extension 3833
Weapons Division (Code EL-12)	Naval Air Development Center Johnsville, Pennsylvania Telephone: OSborne 5-7000 Mr. G. Duval, Extension 215 or 452

^{1/} The Bureau of Aeronautics and the Bureau of Ordnance are being merged in the new Bureau of Naval Weapons.

DEPARTMENT OF THE AIR FORCE

Aeronautical Accessories Laboratories
Wright Air Development Center
Air Research and Development Command,
USAF

Wright-Patterson Air Force Base, Ohio

Telephone: Clearwater 3-7111

Environmental Control Branch (WCLEMA)

Air conditioning: ground air-cooling
and heating equipment

Mr. F. R. Ebersbach
Extension 20214 or 25184

Ground Support Equipment Division (WCLERCC)

Checkout equipment, electronic:
integrated test equipment, automatic
programmer-comparator equipment
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weapon systems and automatic
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Mr. F. Micka
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base equipment including portable
shelters, airport fire-prevention
and -fighting facilities, snow plows
and runway sweepers and
illuminating facilities

Mr. E. M. Kaminski
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Material Research Area

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tective coatings and cleaners

Lt. Col. H. E. Hamlin
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